

REMARKS

After the foregoing Amendment, claims 1, 3, 4, and 6-12, as amended, are pending in this application. Claim 1 has been amended to more particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Claims 2 and 5 stand canceled. Applicant submits that no new matter has been added to the Amendment.

Telephone Communication

Applicant wishes to thank the Examiner for the courtesy of the telephone communication of March 8, 2005 in which the Examiner clarified the Response to Arguments in the Office Action, and for consideration of a proposed amendment.

Rejection - 35 U.S.C. § 103

The Examiner rejected claims 1, 6, 7, 8, 9 10 and 11 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,576,772 (Kondo) in view of US patent No. 6,560,371 (Song et al.). The Examiner states that Kondo describes a method of finding motion vectors comprising steps of generating a first scaled frame and a second scaled frame, performing a best match search of the second scaled frame to identify rough motion vectors and performing a second best match search using the rough motion vectors of the first search, and then, performing a third best match search using the vectors of the second search to identify the final motion vectors. The Examiner states that Kondo does not specifically teach the size of a macroblock but Song et al. teaches that the size of the macroblock can be any size. Applicant respectfully traverses the rejection.

Applicant has amended claim 1 to recite:

*A method of finding motion vectors for use in
MPEG video encoding, the method comprising:
generating from a full frame, (i) a first scaled frame
having a reduced number of pixels as compared to the full frame*

and (ii) a second scaled frame having a reduced number of pixels as compared to the first scaled frame;

defining a size of a macroblock in the full frame;

performing a first, full, best match search of the second scaled frame to identify rough motion vectors, the first search using reference blocks consisting of four scaled macroblocks of the second scaled frame;

performing a second best match search using the rough motion vectors identified by the first search, within a limited range in the X and Y directions for each scaled macroblock of the first scaled frame to identify intermediate motion vectors; and

performing a third best match search using the intermediate motion vectors identified by the second search, within a limited range in the X and Y directions for each macroblock of the full frame to identify final motion vectors.

Neither Kondo nor Song et al. teach or suggest using a reference block of four macroblocks for the first search, as recited in amended claim 1. Kondo, at col. 8. lines 18-58 and in Figs. 9 and 10 clearly teaches using a single scaled macroblock as a reference block for the first search. Song et al. teaches using three different sizes of reference blocks for the first search, each of which is a portion of a macroblock of 16x16 pixels, i.e. a block of 8x8 pixels, a block of 8x4 pixels and a block of 4x8 pixels. (See col. 10, line 61 to col. 11, line 19).

The difference between the claimed invention and the references Kondo and Song et al. lays not with the number of pixels selected for a macroblock since, as pointed out by the Examiner, the number of pixels in a full frame macroblock is arbitrary, but rather with the number of macroblocks used in the reference block to search the frames for detecting motion. In the claimed invention, the size of the reference block used to to perform the first search, i.e. the frame with the smallest number of pixels, is recited as being four macroblocks. Thus, whatever the number of pixels in a full frame macroblock is defined to be, the reference block for

performing the first search of the second scaled frame consists of four scaled macroblocks. IN contrast to amended claim 1, Both Kondo and Song et al. teach performing the first search with a single, or a portion of a single macroblock and not four macroblocks. .

Since neither Kondo nor Song et al. teach or suggest using four macroblocks as a reference block for the first search, neither Kondo or Song et al., either individually or in combination make amended claim 1 obvious. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the §103 rejection of claim 1.

Further, it is respectfully submitted that since amended claim 1 has been shown to be allowable, claims 6-11 dependent on amended claim 1 are allowable, at least by their dependency. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the § 103 rejection of claims 6-11.

Rejection - 35 U.S.C. § 103

The Examiner rejected claim 3 under 35 U.S.C. § 103 as being unpatentable over Kondo in view of U.S. Patent No. 6,560,371 (Song et al.) and further in view of U.S. Patent No. 5,485,210 (Lim et al.).

As discussed above, neither Kondo nor Song et al. teach or suggest performing a first search with a four macroblock reference block. Lim et al. teaches detecting motion vectors of a wavelet transformed signal and does not teach or suggest that a reference block for the first search consist of four macroblocks. Accordingly, since Lim et al. does not make up for the deficiency of Kondo and Song et al., claim 3 dependent on allowable amended claim 1 is allowable, at least by its dependency on amended claim 1. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the § 103 rejection of claim 3.

Rejection - 35 U.S.C. § 103

The Examiner rejected claim 4 under 35 U.S.C. § 103 as being unpatentable over Kondo in view of U.S. Patent No. 6,560,371 (Song et al.) and further in view of U.S. Patent No. 6,430,333 (Okada).

As discussed above, neither Kondo nor Song et al. teach or suggest performing a first search with a four macroblock reference block. Okada teaches controlling the quantization and coding of a picture frame after a scene change and does not teach or suggest that a reference block for the first search consist of four macroblocks. Accordingly, since Okada does not make up for the deficiency of Kondo and Song et al., claim 4 dependent on allowable amended claim 1 is allowable, at least by its dependency on amended claim 1. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the § 103 rejection of claim 4.

Rejection - 35 U.S.C. § 103

The Examiner rejected claim 12 under 35 U.S.C. § 103 as being unpatentable over Kondo. As discussed above, Kondo does not teach or suggest that a reference block for the first search consist of four macroblocks as recited in amended claim 1. Claim 12, is dependent on allowable amended claim 1 and thus is allowable, at least by its dependency on amended claim 1. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the § 103 rejection of claim 12.

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CONCLUSION

Insofar as the Examiner's rejections have been addressed, the application is in condition for allowance and Notice of Allowability of claims 1, 3, 4, and 6-12 is therefore earnestly solicited.

Respectfully submitted,

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